(19) World Intellectual Property Organization

International Bureau



553529

1 ABOUT BUILDING BUILD

(43) International Publication Date 11 November 2004 (11.11.2004)

PCT

(10) International Publication Number WO 2004/097896 A2

(51) International Patent Classification7:

H01L

(21) International Application Number:

PCT/US2004/011873

(22) International Filing Date: 16 April 2004 (16.04.2004)

(25) Filing Language:

English

(26) Publication Language:

English

(30) Priority Data:

PI20031587

26 April 2003 (26.04.2003) MY

(71) Applicant (for all designated States except US): FREESCALE SEMICONDUCTOR, INC. [US/US]; 6501 William Cannon Drive West, Austin, TX 78735 (US).

(72) Inventors; and

(75) Inventors/Applicants (for US only): CHOPIN, Shelia, F. [US/US]; 1110 Briargate, Austin, TX 78753 (US). HARPER, Peter, R. [US/US]; 1903 Blackjack Cove, Roundrock, TX 78681 (US). MONTES DE OCA, Jose, A. [US/US]; 770 N. IH-35 #132, New Braunfels, TX 78130 (US). TAN, Kim Heng [MY/MY]; 167 Jin Athinahapan Satu, Kuala Lumpur, 60000 (MY). TAN, Lan Chu [MY/MY]; WW10-7 Regency Condo Jalan Pelangi, Klang, Selangor, 41300 (MY).

(74) Agents: KING, Robert, L. et al.; Corporate Law Department, Intellectual Property Section, 7700 West Parmer Lane, MD: TX32/PL02, Austin, TX 78729 (US).

(81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.

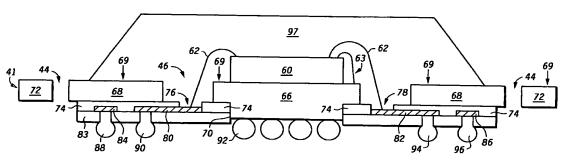
(84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Published:

 without international search report and to be republished upon receipt of that report

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title: A PACKAGED INTEGRATED CIRCUIT HAVING A HEAT SPREADER AND METHOD THEREFOR



(57) Abstract: An integrated circuit (60) is packaged, in one embodiment, by wire bonding to pads (76, 78) supported by tape (83). The tape (83) also supports traces (80, 82) that run from the wire bonded location (76) to a pad for solder balls (90, 94). A heat spreader (69) is thermally connected to the integrated circuit (60) and is located not just in the area under the die (60) but also extends to the edge of the package in the area outside the wire bonding location. This outer area (68) is thermally connected to the area (66) under the die (60) by thermal bars (66) that run between some of the wire bond locations (76, 78). During the manufacturing of the package the heat spreader (69) is connected to slotted rails by tie bars (48, 50, 52, 54). During singulation, the tie bars (48, 50, 52, 54) are easily broken or sawed because they are significantly reduced in thickness from the thickness of the heat spreader (66) as a whole.